

CLAIMS

What is claimed is:

1. A method for preventing or treating a bacterial infection or a viral infection comprising administering a therapeutically effective amount of a tyrosine kinase inhibitor to a subject in need thereof.
2. The method of claim 1, wherein said tyrosine kinase inhibitor inhibits actin motility and viral release and wherein said tyrosine kinase inhibitor is useful for treating or preventing a form of cancer comprising chronic myelogenous leukemia.
3. The method of claim 1, wherein said tyrosine kinase inhibitor inhibits at least one Abl-family tyrosine kinase or Src-family tyrosine kinase.
4. The method of claim 3, wherein said Abl-family tyrosine kinase inhibitor is imatinib mesylate or a pharmaceutically acceptable salt, enantiomer, analog, ester, amide, prodrug, metabolite, or derivative of imatinib mesylate.
5. The method of claim 4, wherein said derivative of imatinib mesylate is STI-X.
6. The method of claim 3, wherein said Abl-family tyrosine kinase inhibitor is a pyrido[2,3-d]pyrimidine.
7. The method of claim 6, wherein said pyrido[2,3-d]pyrimidine is PD173955, PD173952, PD173958, PD173956, PD166326, SKI DV1-10, PD180970; SKI DV2-43, SKI DV2-47, SKI DV1-28, SKI DV2-45, SKI DV2-35, SKI DV2-33, SKI DV2-89, SKI DV-M017, SKI DV-M016, SKI DV2-43, SKI DV2-53, SKI DV2-71, or SKI DV2-87.
8. The method of claim 7, wherein said pyrido[2,3-d]pyrimidine is PD173952 or PD166326.

9. The method of claim 1, wherein said tyrosine kinase inhibitor is ZD-6474, PTK-787/ZK-224584, CP-547632, BMS354825, SU11248, SU011248, gefitinib, or erlotinib.

10. The method of claim 1, wherein said tyrosine kinase inhibitor is administered orally, nasally, buccally, sublingually, intravenously, transmucosally, rectally, topically, transdermally, subcutaneously, by inhalation, or intrathecally.

11. The method of claim 1, wherein said viral infection is caused by a Vaccinia virus, a variola virus, a JC, a BK, a herpes, or a human immunodeficiency virus.

12. The method of claim 1, wherein said bacterial infection is caused by *Escherichia coli*, *Helicobacter pylori*, *Listeria monocytogenes*, *Salmonella typhimurium*, *Shigella Flexneri*, or *Mycobacterium tuberculosis*.

13. A method for administering a tyrosine kinase inhibitor to a subject for the prevention or treatment of a viral infection caused by a Vaccinia virus, a variola virus, a polyoma virus, a Herpes virus, a cytomegalovirus (CMV), or a human immunodeficiency virus.

14. The method of claim 13, wherein said tyrosine kinase inhibitor is an Abl-family tyrosine kinase inhibitor.

15. The method of claim 14, wherein said Abl-family tyrosine kinase inhibitor is imatinib mesylate, STI-X, or a pyrido[2,3-d]pyrimidine.

16. The method of claim 15, wherein said pyrido[2,3-d]pyrimidine is PD173955, PD173952, PD173958, PD173956, PD166326, SKI DV1-10, PD180970; SKI DV2-43, SKI DV2-47, SKI DV1-28, SKI DV2-45, SKI DV2-35, SKI DV2-33, SKI DV2-89, SKI DV-M017, SKI DV-M016, SKI DV2-43, SKI DV2-53, SKI DV2-71, or SKI DV2-87.

17. The method of claim 14, wherein said tyrosine kinase inhibitor is ZD-6474, PTK-787/ZK-224584, CP-547632, BMS354825, SU11248, SU011248, gefitinib, or erlotinib.

18. A method for administering a tyrosine kinase inhibitor to a subject for the prevention or treatment of a bacterial infection caused by *Escherichia coli*, *Helicobacter pylori*, *Listeria monocytogenes*, *Salmonella typhimurium*, *Shigella Flexneri*, or *Mycobacterium tuberculosis*.

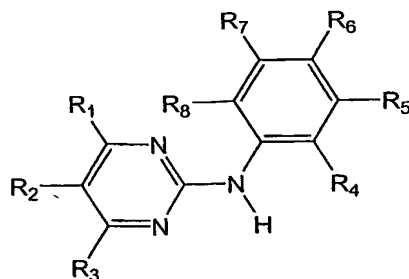
19. The method of claim 18, wherein wherein said tyrosine kinase inhibitor inhibits an Abl-family tyrosine kinase.

20. The method of claim 19, wherein said Abl-family tyrosine kinase inhibitor is imatinib mesylate, STI-X, or a pyrido[2,3-d]pyrimidine.

21. The method of claim 20, wherein said pyrido[2,3-d]pyrimidine is PD173955, PD173952, PD173958, PD173956, PD166326, SKI DV1-10, PD180970; SKI DV2-43, SKI DV2-47, SKI DV1-28, SKI DV2-45, SKI DV2-35, SKI DV2-33, SKI DV2-89, SKI DV-M017, SKI DV-M016, SKI DV2-43, SKI DV2-53, SKI DV2-71, or SKI DV2-87.

22. The method of claim 18, wherein said tyrosine kinase inhibitor is ZD-6474, PTK-787/ZK-224584, CP-547632, BMS354825, SU11248, SU011248, gefitinib, or erlotinib.

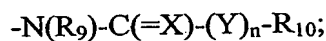
23. A method for preventing or treating a bacterial infection or a viral infection comprising administering a therapeutically effective amount of a tyrosine kinase inhibitor to a subject in need thereof, wherein said tyrosine kinase inhibitor comprises a compound according to the formula:



wherein:

R_1 is 4-pyrazinyl, 1-methyl-1H-pyrrolyl, amino-, or amino-lower alkyl-substituted phenyl wherein the amino group in each case is free, alkylated, or acylated, 1H-indolyl or 1H-imidazolyl bonded at a five-membered ring carbon atom, or unsubstituted or lower alkyl-substituted pyridyl bonded at a ring carbon atom and unsubstituted or substituted at the nitrogen atom by oxygen;

R_2 and R_3 are each independently of the other hydrogen or lower alkyl, one or two of the radicals R_4 , R_5 , R_6 , R_7 , and R_8 are each nitro, fluoro-substituted lower alkoxy or a radical of the formula



wherein:

R_9 is hydrogen or lower alkyl;

X is oxo, thio, imino, N-lower alkyl-imino, hydroximino, or O-lower alkyl-hydroximino;

Y is oxygen or the group NH,

n is 0 or 1; and

R_{10} is an aliphatic radical having at least 5 carbon atoms, or an aromatic, aromatic-aliphatic, cycloaliphatic, cycloaliphatic-aliphatic, heterocyclic, or heterocyclicaliphatic radical;

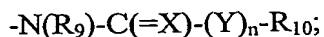
and the remaining radicals R_4 , R_5 , R_6 , R_7 , and R_8 are each independently of the others hydrogen, lower alkyl that is unsubstituted or substituted by free or alkylated amino, piperazinyl, piperidinyl, pyrrolidinyl or by morpholinyl, or lower alkanoyl, trifluoromethyl, free, etherified, or esterified hydroxy, free, alkylated or acylated amino or free or esterified carboxy;

or a pharmaceutically acceptable salt, enantiomer, analog, ester, amide, prodrug, metabolite, or derivative thereof.

24. The method according to claim 23, wherein said tyrosine kinase inhibitor comprises a compound according to the formula of claim 23 wherein:

R_1 is 4-pyrazinyl, 1-methyl-1H-pyrrolyl, amino-, or amino-lower alkyl-substituted phenyl wherein the amino group in each case is free, alkylated by one or two lower alkyl radicals or acylated by lower alkanoyl or by benzoyl, 1H-indolyl or 1H-imidazolyl bonded at a five-membered ring carbon atom, or unsubstituted or lower alkyl-substituted pyridyl bonded at a ring carbon atom and unsubstituted or substituted at the nitrogen atom by oxygen;

R_2 and R_3 are each independently of the other hydrogen or lower alkyl, one or two of the radicals R_4 , R_5 , R_6 , R_7 , and R_8 are each nitro, fluoro-substituted lower alkoxy or a radical of the formula



wherein:

R_9 is hydrogen or lower alkyl;

X is oxo, thio, imino, N-lower alkyl-imino, hydroximino, or O-lower alkyl-hydroximino;

Y is oxygen or the group NH;

n is 0 or 1; and

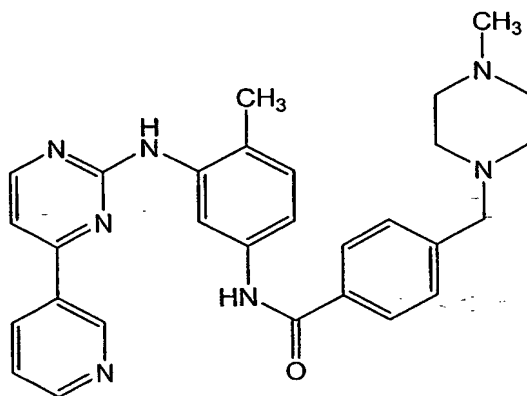
R_{10} is an aliphatic hydrocarbon radical having 5-22 carbon atoms, a phenyl or naphthyl radical each of which is unsubstituted or substituted by cyano, lower alkyl, hydroxyl-lower alkyl, amino-lower alkyl, (4-methyl-piperazinyl)-lower alkyl, trifluoromethyl, hydroxy, lower alkoxy, lower alkanoyloxy, halogen, amino, lower alkylamino, di-lower alkylamino, lower alkanoylamino, benzoylamino, carboxy or by lower alkoxycarbonyl, or phenyl-lower alkyl wherein the phenyl radical is unsubstituted or substituted as indicated above, a cycloalkyl or cycloalkenyl radical having up to 30 carbon atoms, cycloalkyl-lower alkyl or cycloalkenyl-lower alkyl each having up to 30 carbon atoms in the cycloalkyl or cycloalkenyl moiety, a monocyclic radical having 5 or 6 ring members and 1-3 ring hetero atoms selected from nitrogen, oxygen, and sulfur, to which radical one or two benzene radicals may be fused, or lower alkyl substituted by such a monocyclic radical;

and the remaining radicals R_4 , R_5 , R_6 , R_7 , and R_8 are each independently of the others hydrogen, lower alkyl that is unsubstituted or substituted by amino, lower alkylamino, di-lower alkylamino, piperazinyl, piperidinyl, pyrrolidinyl, or by

morpholinyl, or lower alkanoyl, trifluoromethyl, hydroxy, lower alkoxy, lower alkanoyloxy, halogen, amino, lower alkylamino, di-lower alkylamino, lower alkanoylamino, benzoylamino, carboxy, or lower alkoxycarbonyl;

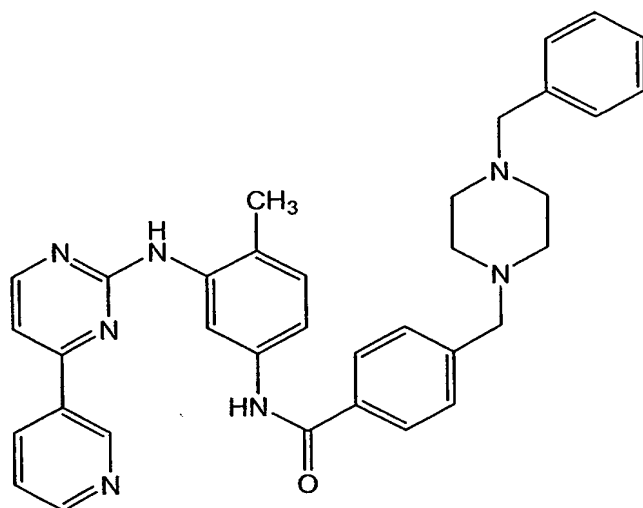
or a pharmaceutically acceptable salt, enantiomer, analog, ester, amide, prodrug, metabolite, or derivative thereof.

24. A method for preventing or treating a bacterial infection or a viral infection comprising administering a therapeutically effective amount of a tyrosine kinase inhibitor to a subject in need thereof, wherein said tyrosine kinase inhibitor comprises a compound according to the formula:



or a pharmaceutically acceptable salt, enantiomer, analog, ester, amide, prodrug, metabolite, or derivative thereof.

25. The method according to claim 24, wherein said tyrosine kinase inhibitor comprises a derivative according to the formula:



or a pharmaceutically acceptable salt, enantiomer, analog, ester, amide, prodrug, metabolite, or derivative thereof.